

Streptopelia senegalensis (Linn.). **The Little Brown Dove.**

One seen at Siuni on May 19. Occasionally seen near Ranikhet after that date.

Streptopelia decaocto (Frivaldszky). **The Indian Ring-Dove.**

Fairly numerous. A pair had just completed a nest on Aug. 17 (when I revisited Ranikhet for two days), and the hen was on the nest and appeared to be in the act of laying when I left.

Gennæus hamiltoni (Griff.). **The White-crested Kalij.**

A pair seen on May 21, and on two or three subsequent occasions. They were always seen in pairs, and always in the more open type of forest.

Francolinus francolinus (Linn.). **The Black Partridge.**

One bird was always calling vigorously in the early morning, and sometimes in the evening, in thick, low scrub below the pipe-line, from May 28, onwards. On one occasion my dogs flushed a cock from the spot where he was always to be heard, but on no occasion did I see a hen.

Lobivanellus indicus (Boddært). **The Red-wattled Lapwing.**

A pair at Siuni on May 19 appeared to be breeding from their behaviour. No other record.

F. S. BRIGGS.

XX.—HOVERING FLIGHT OF BIRDS AND NO WIND.

The flight of birds has always been of great interest to me, but it is a behaviour involving great diversity and complexity of method. Each species of bird has its own distinctive methods, resulting in highly characteristic wing-movements, trajectories and velocities. Some birds are eminently superb gliders on motionless wing when they choose, as our hawks, eagles and buzzards. Others dash along with the directness of an arrow like the ducks and geese, fanning the air with tremendous persistence and energy.

I was much interested in the entertaining discussion of Major R. W. Hingston, 'Effect of wind on the flight of birds', *Journal of the Bombay Natural History Society*, Vol. xxxiii, No. 4, 1929, pp. 992-994. A comment, however, is needed here, bearing on his discussion, 'Effect of Wind on Hovering Flight'. While it may be true, as he states, that many birds as the kestrels, kingfishers and terns, take advantage of wind to perform their hovering activities, one of our American birds, the Ruby-throated Humming Bird quite refutes the concept that birds which poise need wind. Major Hingston's statement that 'No bird can employ its wings for the purpose of just raising itself vertically; there must always be some forward pushing element in the strokes', caught my attention especially, and our little Eastern ruby-throat at once came to mind. During the summer of 1930, I spent much time with these gay visitors in my garden, studying more critically their behaviour in flight. As a result of these observations, I feel that I can confirm my earlier opinions with some confidence.

I feel that we must recognize two types of hovering birds, those that may depend to a greater or less degree upon wind to help sustain their poise, and those that can hold themselves stationary in the air in a motionless poise of the body that must ever excite the utmost admiration. The great, distinctive, strictly New World humming bird family, indigenous to the Americas alone, exemplifies the latter behaviour. It may be a more or less specialized feature of the flight of these living gems,—it is probably more or less a family trait,—Since a flower-prober must often find it necessary to suspend itself in mid-air to delve into far-flung suspended blossoms. However this may be, I can speak alone for the diminutive ruby-throat of the eastern United States. I have often been within arm's length of its presence before my tiger lilies and Bee Balm (*Monarda didyma*), watching intently its marvellous grace as it literally hung its body in mid-air on invisible, whirring wings.

No wind is needed to perform its aerial evolutions before the flowers it visits. In truth a wind is disconcerting to it at times, tending to break the beautiful equilibrium of its motionless poise. On the calmest days its superb poise is seen, a perfect organic gem entering, receding, swerving, moving upward and downward in its systematic search from flower to flower. Let me state here that this marvellous flyer can elevate itself vertically as far as it chooses, drop slowly to lower levels with perfect ease as if floating in the atmosphere, even move backwards some distance away from a flower as it withdraws its bill and advances to another. All the while it moves its wings with such rapidity that only a glinting *whirr* is seen where its wings should be. How the tiny thing does all this, I cannot say, but in some manner the forward push of its wing-strokes is a component somehow neutralized even if it exists at all, and the bird remains stationary as long as it chooses as easily as some of the hover flies. I have seen them in their play with each other magnify all these capacities of movement, vertically, forwards, backwards. Furthermore, I saw one evening a flying behaviour on its part that I had never before witnessed. I had been inclined to feel that rapidity of wing-beat must be a fixed feature of its flight, but on this particular evening it zoomed over a high rose hedge, and holding its wings outstretched in a strangely quiescent position for a humming bird, glided down past me like a tiny emerald airplane and away, fast losing altitude as it went, perhaps intentionally, perhaps from necessity.

I doubt if we know much yet about the flight of many birds, notably among these the humming birds. I am inclined to believe they have an almost gyroscopic power of lifting and lowering their poising bodies with their swift-beating wings. Surely they can reverse the forward-pulling component of their strokes and push themselves smoothly backwards, or oscillate in the air like a living pendulum. It would be no simple matter to analyze the humming bird's wing movements, but I am inclined to believe the stroke and twist of the wings may be such as to do away at times with the usual forward component, allowing an exercise alone of the lifting, vertical component. Who knows what the gyratory twistings of these tiny wings may actually be at such times? To say the least in order to manipulate their play and strokes, their speed and positions

with such nicety as to hold the body motionless in mid-air demands a marvellous control of the wings, a marvellous sensitivity of balancing forces and a most refined adjustment of the stroke, its power, speed, direction, to establish such a perfect equilibrium with the downward pulling forces of gravitation—and all in spite of wind.

WASHINGTON, D.C.,
June, 1930.

H. A. ALLARD,
U. S. Department of Agriculture.

XXI.—PELICANS AND TURTLES.

On the afternoon of September 4, 1930, two Pelicans were found with Turtles hanging from their beaks in the Aquatic Birds' Pond in the Victoria Gardens. They were trying to swallow them. Each of the turtles weighed $9\frac{1}{2}$ lbs. with a carapace $9\frac{1}{2}$ inches long and about $8\frac{1}{2}$ inches wide. Quite a mouthful even for a Pelican!

As soon as the keeper noticed this incident he drove the birds out of the pond and when they were on the lawn they immediately disgorged their victims. One of the Pelicans in the act got injuries to the pouch caused by the claws of the turtle with the result that there was a lacerated wound about 4 to 5 inches in length. The wound was dressed and treated with antiseptic and about 8 stitches were put in. The Pelican was in no way incapacitated from feeding. The wound healed up within a month, and the Pelican is now in the pond with others as happy as ever.

VICTORIA GARDENS,
BOMBAY,
October 31, 1930.

D. S. LAUD,
Supdt., Municipal Gardens.

XXII—LITTLE INDIAN GREBES OR DABCHICKS (*PODICEPS ALBIPENNIS*) MOBBING A SNAKE.

The other day, while out for a walk with my wife on the *bund* of a local tank, the following incident was observed which may be of interest.

A snake started to swim across the tank and was followed by a dabchick. The snake was very uneasy as the dabchick was obviously trying to attack it, and several times turned and went for the bird who, however, easily evaded it. This fracas attracted other dabchicks and the snake made for a small island; the dabchicks, six in all, following, turned him off the island and he again had to swim for it, harrassed by the birds whom he frequently turned and tried to attack. The dabchicks, however, stuck to him and saw him off the tank. The snake was obviously not a water-snake or he would have dived and avoided these attacks. We were not near enough to identify the snake but I fancy it must have been a Dhaman (*Zamenis mucosus*) as these are very common about the tanks at Hyderabad. The dabchicks cannot have been